Abstract Submitted
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Enhanced photon-assisted spin transport in a quantum dot attached to ferromagnetic leads[1] FABRICIO M. SOUZA, Instituto de Fisica, Universidade Federal de Uberlandia, THIAGO L. CARRARA, Universidade Federal do Triangulo Mineiro, EDSON VERNEK, Instituto de Fisica, Universidade Federal de Uberlandia — Time-dependent transport in quantum dot system (QDs) has received significant attention due to a variety of new quantum physical phenomena emerging in transient time scale.[1] In the present work [2] we investigate real-time dynamics of spin-polarized current in a quantum dot coupled to ferromagnetic leads in both parallel and antiparallel alignments. While an external bias voltage is taken constant in time, a gate terminal, capacitively coupled to the quantum dot, introduces a periodic modulation of the dot level. Using non equilibrium Green's function technique we find that spin polarized electrons can tunnel through the system via additional photon-assisted transmission channels. Owing to a Zeeman splitting of the dot level, it is possible to select a particular spin component to be photon-transferred from the left to the right terminal, with spin dependent current peaks arising at different gate frequencies. The ferromagnetic electrodes enhance or suppress the spin transport depending upon the leads magnetization alignment. The tunnel magnetoresistance also attains negative values due to a photon-assisted inversion of the spin-valve effect. [1] F. M. Souza, Phys. Rev. B 76, 205315 (2007). [2] F. M. Souza, T. L. Carrara, and E. Vernek, Phys. Rev. B 84, 115322 (2011).

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